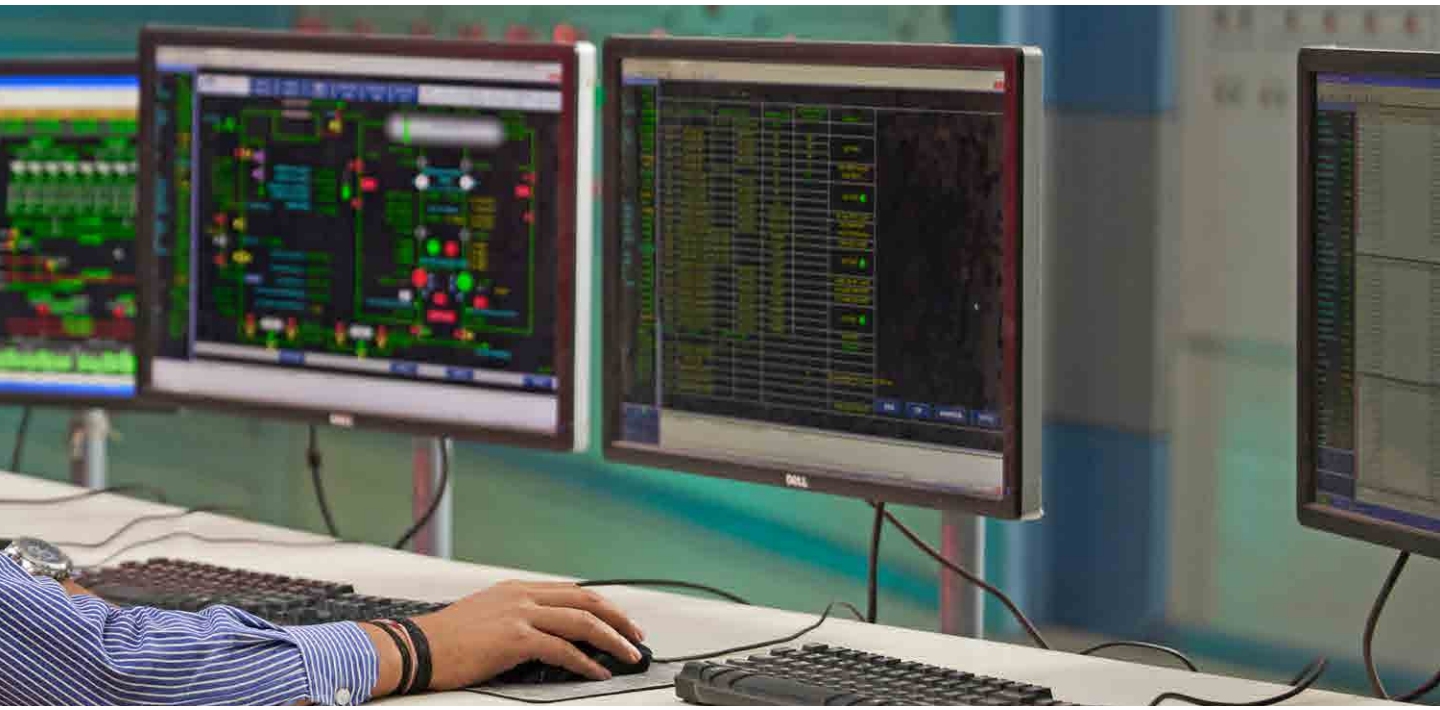
Intellectual Capital

Investment in its Intellectual Capital is the cornerstone of our journey to become a Net Zero company by 2050. Innovation is one of the key components at JSW Energy for transcending to the future energy scenario by treading on the path of decarbonisation and energy efficiency. Being one of India's leading private sector energy companies, it continually keeps enhancing its operations with improving or replacing business processes to increase efficiency and productivity.

Intellectual Capital at JSW Energy is composed of intangible and knowledge-based assets, a strategic element for JSW Energy. This embraces adaption to newer technologies, exploring digitalisation in many forms for efficiency and development of new products and services and increases our competitive advantage. It also includes disruptive technologies and business models that enable us to transition towards a modern and innovative renewable power company.

Innovation is pursued as one of our main pillars for successfully facing the future energy scenario, promoting energy efficiency, decarbonisation and electrification of the economy. We are one of India's leading private sector energy companies, making consistent enhancements to our ongoing operations.

During FY2022, we focused on implementing innovative enhancements through process improvements, system updations and IT systems and infrastructure upgradations. We constantly built new competencies and capabilities, and augmented digitalisation to become a tech-centric future-ready company. Disruptive technologies and business models are helping us discover new opportunities and facilitate the transition to emerge as an innovative renewable power company.



Cost incurred in FY2022 on Technology and Digitalisation

₹110.65 crore

Investment towards Technological Upgradation

₹33.50 crore

Investment committed for Digitalisation

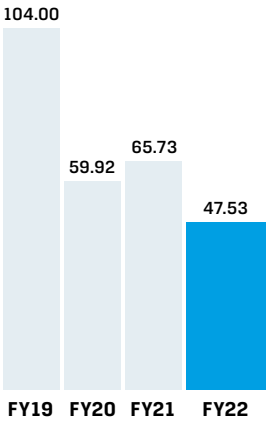
Driving digitalisation

Boston Consulting Group (BCG) has been onboarded to drive the digitalisation process across our existing thermal business and renewable verticals. We are conceptualising a state-of-the-art technology enabled "Integrated digital cockpit @Vijayanagar Plant" to cater to existing and future digitalisation demands, as we move forward. The BCG team is assisting us in the below processes:

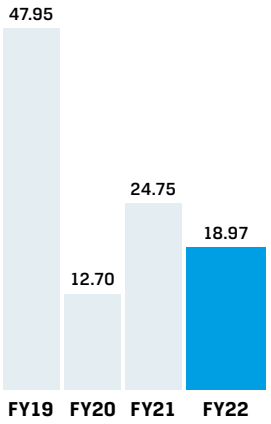
- Analysing the organisation's requirements
- Ability to scale to recommend right digital processes
- Experience transformation guideposts that help us effectively use digital technology
- Tools and platforms for optimum utilisation
- Moving towards automation at all levels

Process improvement and governance

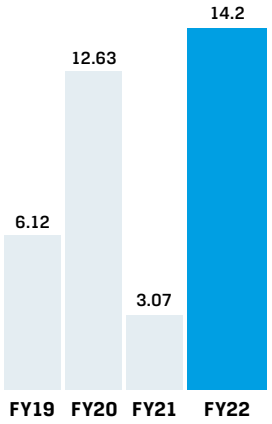
Energy saved due to Energy conservation initiatives (MU)



Monetary Savings due to Energy Conservation (₹ Crore)



Cost incurred towards intellectual Capital to increase operational margin by optimising process, systems, IT and Infrastructure (₹ Crore)



A culture of continuous improvement

Technology and a culture of continuous improvement are the key enablers towards achieving our strategic goals of industry and cost leadership, improve speed and efficiency, increase production, decrease costs, and provide a better customer experience. Our innovative ideas lead to significant continuous improvements and facilitate us in becoming best-in-class and setting new benchmarks.

Our two-pronged approach towards R&D is well supported by our commitment towards innovation and robust resource allocation. With these ideas and with shifts in business models and technology, we create new value propositions and further our stakeholder value. Our process improvement initiatives remained well focused on energy conservation. This was achieved through optimising consumption of auxiliary power, start-up oil and coal.

Creating value

With customer needs changing constantly, renewables gaining pace and increasing regulatory risks, we work towards innovating and adapting to change. By improvising on our production processes, cost competitiveness and environmental performance, we are creating further value. We are also gaining long-term advantages by capability building and collaboration with technology and research partners. During the year, we put innovative enhancements in place through process improvements, system updates and infrastructure upgradations to make these contribute to business growth and increased market share.

Enabling Remote Operations during COVID-19

Given the COVID restrictions, we maintained our capability to remotely handle our Operations & Maintenance services. This was ensured by setting up Human Machine Interface Stations in respective townships where the energy plants are located. Even as access to plant premises continued to pose a challenge, we ensured timely support of our operations. Further, we also continued the concept of the virtual world connect on a single platform during the lockdown phase. With the aim of achieving a common goal, all our sites and people were brought on a single platform to collaborate in a unified working culture and to meet the requirements of business prevailing at that time.

Key Upgradations

Upgrading Infrastructure

At JSW Energy, we are continually progressing towards an enhanced and balanced IT support system and infrastructure. Our constant focus is to implement high-end technology and upgrade existing infrastructure. The installation of support routing between different VLAN installed in the previous year to improve fault isolation well supports high-speed scalability and accountability. Security management control and monitoring of network traffic routing has been further augmented. Live and historical monitoring is done of all the shop floor applications.

Cyber Security Enhancements

With technological upgradation, cybersecurity continues to be an important firewall. The smart protection suite has been standardised at end-user level through efficient deployment of Trend Micro AV with primary and secondary servers. This is aimed towards facilitating the periodical auto refreshment of patches. Further, by hardening of all services, we have re-architected perimeter firewalls across all energy plants. We also deployed Vulnerability Management system to proactively identify errors and rectify them before it is exploited by external/internal intrusion or malware. Further, we enabled secure mode access and periodic risk assessment for public-facing systems and applications for plant-related data monitoring.

Energy Saving Initiatives

Barmer Plant

APH Tube Plugging done in Unit#6

Problem: Primary Air (PA) fan, secondary Air (SA) fan and Induced draft (ID) fan energy consumption was increasing progressively in Unit-6 Boiler due to APH leakage.

Solution: Unit shutdown was taken and APH tube plugging was done.

Benefit: Reduction in Total Fan Power consumption by 453.14 KW.

11,219.26 GJ
Energy Reduction

1,133.15 tCO_2e
GHG Emissions Saved

APH Tube replacement done in Unit#7

Problem: Primary Air (PA) fan, secondary Air (SA) fan and Induced draft (ID) fan energy consumption was increasing progressively in Unit-7 Boiler due to APH leakage.

Solution: Unit shutdown was taken and APH tube replacement was done.

Benefit: Reduction in Total Fan Power consumption by 1981.99 KW.

26,523.31 GJ
Energy Reduction

2,678.85 tCO_2e
GHG Emissions Saved

APH Tube Plugging done in Unit#5

Problem: Primary Air (PA) fan, secondary Air (SA) fan and Induced draft (ID) fan energy consumption was increasing progressively in Unit-5 Boiler due to APH leakage.

Solution: Unit shutdown was taken and APH tube plugging was done.

Benefit: Reduction in Total Fan Power consumption by 377.05 KW.

8,090.24 GJ
Energy Reduction

817.11 tCO_2e
GHG Emissions Saved

APH Tube replacement done in Unit#2

Problem: Primary Air (PA) fan, secondary Air (SA) fan and Induced draft (ID) fan energy consumption was increasing progressively in Unit-2 Boiler due to APH leakage.

Solution: Unit shutdown was taken and APH tube replacement was done.

Benefit: Reduction in Total Fan Power consumption by 1655.69 KW.

19,739.85 GJ
Energy Reduction

1,993.72 tCO_2e
GHG Emissions Saved

APH Tube Plugging done in Unit#3

Problem: Primary Air (PA) fan, secondary Air (SA) fan and Induced draft (ID) fan energy consumption was increasing progressively in Unit-3 Boiler due to APH leakage.

Solution: Unit shutdown was taken and APH tube plugging was done.

Benefit: Reduction in Total Fan Power consumption by 710.61 KW.

9,493.79 GJ
Energy Reduction

958.87 tCO_2e
GHG Emissions Saved

APH Tube replacement done in Unit#4

Problem: Primary Air (PA) fan, secondary Air (SA) fan and Induced draft (ID) fan energy consumption was increasing progressively in Unit-4 Boiler due to APH leakage.

Solution: Unit shutdown was taken and APH tube replacement was done.

Benefit: Reduction in Total Fan Power consumption by 2021.39 KW.

14,549.71 GJ
Energy Reduction

1,469.47 tCO_2e
GHG Emissions Saved

89,616.16 GJ
Total Energy Reduced

9,051.17 tCO_2e
Total GHG Emissions Saved

Ratnagiri Plant

	Energy Reduced (GJ)	GHG Emissions Saved (tCO_2e)
Improvement in air pre heater performance by changing baskets in Unit-4	38,275	4,181
Internal inspection of HPH-7 in Unit-1 and rectification of passing parting plane	19,595	1,749
Attending RH spray control valve passing in Unit-3 by valve setting and calibration so as to avoid RH flow losses	4,617	412
Change in deaerator level control logic to optimise CEP power consumption by controlling its discharge pressure	1,369	332
Elimination of HFO guns by replacement with LDO guns in Unit-4	14,357	1,464
Reduction in power consumption of Unit-3 boiler feed water pump by de-staging	3,128	753
TOTAL	**81,341**	**8,891**

Vijayanagar Plant

	Energy Reduced (GJ)	GHG Emissions Saved (tCO_2e)
Reserve shutdown units TG barring gear and JOP stopped to reduce wear and tear and increase availability of Turning gear	2.677	240.837
BFP Power optimization done by replacing the RC valve trim set	10.506	945.083
SBU 1 Unit 1 BFP 1C RC valve passing arrested	2.338	210.29
SBU2 BFP 1A RC Passing arrested	4.502	404.95
PA 1A Scoop replacement PA 1A Scoop hunting	0.597	53.72
Instrument Air Compressor Power Consumption Optmisation by attending leakage & reducing Header pr to 5.5Kg/cm	2.545	228.92
SBU2 U1 CEP Bypass MOV open Power Savings. Deaearator level CV across throttling losses optimised	1.507	135.54
SBU1 Compressor -A Power Consumption Optmisation Mode of operation changed from BASE mode to SUCTION THROTTLING MODE, & Current set point changed for (38) to (35) amps	2.134	192.01
TOTAL	**26.806**	**2,411.35**